

REMARKS/ARGUMENTS

Claims 18-22, 24-26, 28-29, and 31-32 are pending in the Application. Claim 23 is canceled. Method Claims 17, 27, and 30, which were withdrawn from further consideration by the Examiner as directed to inventions non-elected in response to a restriction requirement (Office Action dated August 12, 2009 (OA), page 2), are canceled in favor of divisional prosecution. Claims 18, 19, and 26 are currently amended. Claims 31-32 are new.

Previously presented Claim 18 is currently amended to incorporate the process limitations of canceled Claim 17. Currently amended Claim 18 and new Claims 31-32 specify the amount of the polyurethane resin (2) and the amount of the epoxy resin (1) in percentages by weight, based on the sum of resins (1) and (2). Support therefore is found in the Specification at page 12, line 31, to page 13, line 2. Previously presented Claim 26 has been amended to limit the storage-stable aqueous dispersion of Claim 25 to a laminating adhesive which is storage stable for 2 weeks. Support for currently amended Claim 26 is found in the Specification at page 17, lines 6-20.

No new matter is added.

Preliminary Remarks

The Examiner's withdrawal of the previous rejections of Claims 18-26, 28 and 29 under 35 U.S.C. 103 over Miyamoto (U.S. Patent 5,656,701, issued August 12, 1997) in view of Kobayashi (U.S. Patent 5,662,966, issued September 2, 1997) is greatly appreciated (OA, p. 4, ¶ 4).

Attached hereto is a certified English translation of Applicant's priority Application DE 10353953.0, filed November 18, 2003, in Germany. The English translation shows that Applicant is entitled to their claim under 35 U.S.C. 119 for benefit of the filing date of their German priority document for the full scope of the subject matter currently claimed. Thus, Applicant has antedated the June 30, 2004, filing date of Provisional Application 60/584,726

cited in Wissing (US 2006/0003166 A1, published January 5, 2006, from Application 11/159,380, filed June 22, 2005). Accordingly, Wissing is not prior art under 35 U.S.C. 102(e), and the rejections of Applicant's current claims under 35 U.S.C. 102(e)/103(a) over Wissing should be withdrawn (OA, pp. 2-3, ¶ 2).

Rejections of Claims 18, 19, 21-23, 28 and 29 under 35 U.S.C. 102/103 over Krishnan

Previously presented Claims 18, 19, 21-23, 28 and 29 were rejected under 35 U.S.C. 102/103 over Krishnan (U.S. Patent 5,492,550, issued February 20, 1996)(OA, p. 8, ¶ 8). As applied to Applicant's currently amended claims, the rejections should be withdrawn.

In *Abbott Laboratories v. Sandoz, Inc.*, ____ F.3d ____ (Fed. Cir. 2009), decided May 18, 2009, the Federal Circuit stated:

[B]ased on Supreme Court precedent and the treatment of product-by-process claims throughout the years by the PTO and other binding court decisions, this court now restates that "process terms in product-by-process claims serve as limitations in determining infringement." *Atlantic Thermoplastics Co. v. Faytex Corp.*, 970 F.2d 834, 846-47 (Fed. Cir. 1982)] As noted earlier, this holding follows this court's statement in *In re Thorpe*[, 777 F.2d 695 (Fed. Cir. 1985)] that "product by process claims are limited by and defined by the process." 777 F.2d at 697.

Applicant's currently amended claims are limited by and defined by the process steps recited in currently amended Claim 18. According to currently amended Claim 18, an epoxy resin (1) is added to a solvent solution of a polyurethane (2) having hydrophilic groups such that the amount of the polyurethane resin is 50 to 99% and the amount of the epoxy resin is 1 to 50% by weight, based on the sum of resins (1) and (2). It is believed that when Applicant's mixture of epoxy resin is added to a solvent solution of polyurethane having hydrophilic groups and dispersed in water, optionally with the removal of 90% by weight of the solvent, the polyurethane resin having hydrophilic groups tends to isolate the epoxy resin from the water due to the greater attraction of the hydrophilic groups of the polyurethane resin for the water. As a result, when the amine crosslinker for the epoxy resin is added to the aqueous dispersion of resins (1) and (2), the reaction between the epoxy resin and the

amine crosslinker is hindered and the adhesive characteristics of the aqueous dispersion thus remain stable for at least 72 hours. The amount of polyurethane resin is 50 to 99% and the amount of epoxy resin is 1 to 50% by weight, based on the sum of resins (1) and (2), in Applicant's currently claimed storage-stable aqueous dispersions.

In other words, the storage-stability of the dispersions as claimed is the result of the method of making the dispersions. An epoxy resin is added to a polyurethane solution and the mixture of polyurethane and epoxy resin is then dispersed in water. Finally the amine crosslinker is added. The storage stability of the resulting composition is believed to result from a protection of the epoxy resin. The epoxy resin is believed to be inside the emulsified particles and the polyurethane with its hydrophilic groups forming an outer layer of the emulsified particles which protects the enclosed epoxy resin from interaction with the amine compound in the continuous phase of the emulsion.

On the other hand, Krishnan does not teach or suggest such storage stable dispersions. Krishnan add epoxy compounds and amine to polyurethane emulsions, i.e., only the polyurethane is emulsified and both the amine and the unprotected epoxy compounds are together in the continuous phase and therefore interact and react with one another. Thus, Krishnan discloses reaction products of polyurethane emulsions with an epoxy-functional material and an amine-functional material. Krishnan does not disclose storage-stable compositions, i.e., compositions containing compounds which are protected from interacting and reacting with each other which would otherwise interact and react with each other. Typically, epoxy compounds and amine compounds react with each other and are not storage-stable when combined.

Krishnan teaches (Krishnan, col. 6, lines 51-63 emphasis added):

[T]he inventive binder comprises materials selected from the group consisting of:
a) the reaction product of . . . isocyanate-terminated polyurethane prepolymers with an amine-functional material having an average amine functionality of at least 2;

b) the reaction product of . . . isocyanate-terminated polyurethane prepolymers with a first adduct . . . and c) the reaction product of . . . isocyanate-terminated polyurethane polymers having a high molecular weight, the polymers having a plurality of ionic moieties, with a second adduct . . .

Only reaction products b) and c) appear to relate to the aqueous dispersions Applicant claims.

Krishnan teaches that “[t]he first adduct comprises the reaction product of an amine-functional material having an average amine functionality of at least 2 and an epoxy-functional material having an average epoxy functionality of at least 2” (Krishnan, col. 7, ll. 4-7; emphasis added). Krishnan teaches that “[t]he second adduct (formed as an example in Reaction 3 . . .) comprises the reaction product of the amine-functional material and the epoxy-functional material, with the provisos that the second adduct has at least one epoxy-functional group reactive with the ionic moieties and at least one amine functional group reactive with the ionic moieties” (Krishnan, col. 13, ll. 12-17; emphasis added).

Regarding reactions between the polyurethane prepolymer and the first adduct, Krishnan states (Krishnan, col. 10, ll. 10-25; emphasis added):

[I]t is currently believed that, when the three components of the inventive binder of the polyurethane prepolymer/adduct reaction product are combined, the more reactive functionality of the amine-functional material initially reacts with epoxide groups of the epoxy-functional material to form an epoxy/amine adduct (Reaction 1). When aqueous emulsions are employed, water evaporates upon heating followed by cleavage of the ketoxime blocking group from the polyurethane prepolymer to allow the now free isocyanate groups to react with the available amine groups of the epoxy/amine adduct (Reaction 2).

Regarding reactions between the polyurethane polymer and the second adduct, Krishnan states (Krishnan, col. 14, ll. 15-31):

It is believed that when the epoxy-functional material and the amine-functional material are added to the polyurethane polymer emulsion, both the amine-functional material and the polyurethane polymer react with the epoxy functionalities of the epoxy functional material (Reaction 3). Since the reactivity of the amine-functional material with the epoxy-functional material is generally higher than that of the amine-functional material with the polyurethane polymer, and since the excess epoxy moieties further react with the polyurethane, it is advantageous to add a sub-stoichiometric amount of the amine functional material. The resulting adduct, having available unreacted epoxy groups, further reacts via those excess epoxy groups with

excess ionic moieties on the polyurethane to create a tough, cured inventive binder (Reaction 4).

It should be apparent to the Examiner from Krishnan's disclosure that the amine-functional material reacts with the epoxy-functional material before it is added to the polyurethane prepolymer or the amine-functional material preferably reacts with the epoxy-functional material before it reacts with the polyurethane polymer. Krishnan's processes invariably involve the reaction of the amine-functional material with the epoxy-functional material before the reaction with the polyurethane resin. See Reaction 1 bridging columns 9 and 10 of Krishnan and Reaction 3 bridging columns 13-16 of Krishnan. As a result, Krishnan does not appear to be concerned with the amount of epoxy-functional material relative to the amount of polyurethane resin. See Krishnan's Example 19 wherein a coating comprising 63.3% "EPI-REZ CMD-35201" epoxy, 1.18% isophoronediaamine and 35.52% "IMPERNIL-DNL" urethane was completely cured by heating (Krishnan, col. 24, ll. 15-29). See Krishnan's use of substantial excesses of epoxy-functional material relative to the weight of polyurethane emulsion in Examples 1-6 of Table 1 (Krishnan, col. 28, ll. 25-51), Examples 7-16 of Table 3 (Krishnan, col. 28, l. 53, to col. 29, l. 10), and Examples 27-29 of Table 5 (Krishnan, col. 29, ll. 25-46). The percentages by weight of polyurethane resin (PU) and epoxy resin (EP) in Applicant's currently amended Claim 18 are 50 to 99% by weight PU and 1 to 50% by weight EP. The percentages by weight of polyurethane resin (PU) and epoxy resin (EP) in Applicant's new Claim 31 are 60 to 90% by weight PU and 10 to 40% by weight EP. The percentages by weight of polyurethane resin (PU) and epoxy resin (EP) in Applicant's new Claim 32 are 65 to 75% by weight PU and 25 to 35% by weight EP.

Moreover, unlike the process Applicant claims, Krishnan's coatings are prepared using epoxy emulsions and polyurethane emulsions. See Krishnan's Examples 17-19 (Krishnan, col. 23, l. 40, to col. 24, l. 36); and Examples 1-31 (Krishnan, col. 25, l. 38, to col. 29, l. 47).

Krishnan teaches a process which comprises: (1) reacting an amine-functional material with an epoxy-functional material before the reaction with a polyurethane in aqueous emulsion or in preference to the reaction of the amine with a polyurethane in an aqueous emulsion. By Applicant's process, an epoxy resin is added to a solvent solution of polyurethane to form a mixture, the mixture is dispersed in water, the solvent is optionally removed, and an amine crosslinker for the epoxy resin is then added to the dispersion. As shown in Krishnan's Reactions 1 and 3 (Krishnan, cols. 9-10 and 13-16), Krishnan's reaction product primarily contains the following structure:

Polyurethane-Epoxy Resin-Amine.

On the other hand, Applicant's claimed storage-stable aqueous dispersion product primarily contains the following structure:

Epoxy Resin-Polyurethane-Amine.

Krishnan's reaction product is cured under heat to a hard coating. Applicant's reaction product is a storage-stable adhesive.

It would be apparent to a person having ordinary skill in the art that the products defined by Applicant's current claims, which are produced, limited and defined by the specified process steps therein, are patentably distinct from, and unobvious in view of, the products prepared by the processes Krishnan discloses. Moreover, the relative percentages of epoxy resin to polyurethane resin in Applicant's claimed storage-stable dispersions aid in promoting production of the product Applicant claims by the process specified. Additionally, it would have been obvious to persons having ordinary skill in the art that the product Applicant claims cannot be produced by any process Krishnan discloses, especially when the epoxy and polyurethane resins used to produce Krishnan's reaction products in accordance with Krishnan's disclosed processes are themselves aqueous emulsions of the resins.

For the reasons stated, the products-by-process Applicant claims are not anticipated by Krishnan under 35 U.S.C. 102 and reasonably would not have been suggested by, or obvious under 35 U.S.C. 103 in view of, Krishnan's disclosure. Accordingly, the Examiner's rejections, as applied to Applicant's currently amended and new claims, should be withdrawn.

Rejection of Claim 20 under 35 U.S.C. 103 over Krishnan in view of Miyamoto

Previously presented Claim 20 was rejected under 35 U.S.C. 103 over Krishnan in view of Miyamoto (U.S. Patent 5,656,701, issued August 12, 1997)(OA, p. 11, ¶ 9). The rejection should be withdrawn.

Miyamoto is relied upon by the Examiner for its teaching of high molecular weight polyurethanes and the process and reactants Miyamoto used to make the same. Even assuming it would have been obvious to persons having ordinary skill in the art to make and use Krishnan's coating compositions using a polyurethane taught by Miyamoto, none of the other previously indicated deficiencies in Krishnan's disclosure are cured by Miyamoto's teaching. No combination of Krishnan and Miyamoto would have led persons having ordinary skill in the art to the products-by-process defined by Applicant's current claims. Accordingly, the Examiner's rejection of Claim 20 also should be withdrawn.

Rejections of Claims 18-22 and 24-26 under 35 U.S.C. 102/103 over Wissing

Previously presented Claims 18-22 and 24-26 were rejected under 35 U.S.C. 102/103 over Wissing (US 2006/0003166 A1, published January 5, 2006)(OA, p. 5, ¶ 7). Applicant has attached a certified English translation of Applicant's priority Application DE 10353953.0, filed November 18, 2003, in Germany, and the English translation shows that Applicant is entitled to their claim under 35 U.S.C. 119 for benefit of the filing date of their German priority document for the full scope of subject matter currently claimed. Thus, Applicant has antedated the June 30, 2004, filing date of Provision Application 60/584,726

cited in Wissing (US 2006/0003166 A1, published January 5, 2006, from Application 11/159,380, filed June 22, 2005), and the rejection properly should be withdrawn (OA, pp. 2-3, ¶ 2).

Nevertheless, Applicant is obliged to respond to the merits of the rejection. The Examiner concludes that there is no definition of “storage-stable” in Applicant’s Specification (OA, p. 4, ¶ 3). Therefore, “so long as the system remains ‘stable’ between the time the crosslinker is added and the time the system is used as an adhesive” (OA, p. 4, ¶ 3), the prior art describes a “storage-stable” system. The Examiner cites and relies upon the Specification’s teaching at page 14, lines 25-26, which reads, “The addition [of crosslinker] can therefore be made at an arbitrary point in time and the use of the system as an adhesive can take place at an arbitrary, later point in time.” With all due respect, the Examiner misses the point of that sentence.

Applicant is not there defining the term “stable” as any arbitrary point of time between the time the crosslinker is added and the time the system is used as an adhesive. Rather, the Specification there teaches persons having ordinary skill in the art that, because of the storage-stability of the claimed adhesive, the crosslinker may be added at any arbitrary point in time and the adhesive may be used at any arbitrary point of time after the addition of the crosslinker. Persons having ordinary skill in the art are thus granted much greater flexibility in the times between first preparing the adhesive and ultimately using the adhesive after the adhesive is first prepared. As a result of Applicant’s invention, the amounts of adhesive to be initially prepared, and the number of times and the amounts of adhesive to be used each time the adhesive is to be used after initial preparation, need not be strictly controlled and monitored. The flexibility proffered by Applicant’s claimed adhesive is greatly improved over the prior art.

What does Wissing teach? Wissing teaches (Wissing [0071]), “The coating composition according to the invention is conventionally provided in the form of a two-pack composition.” Wissing explains ([0071]; emphasis added):

At least the binder components A) and B) which are reactive with one another must be stored separately and can only be mixed with one another just before application. The urethane resin can be present in the epoxy resin component A), in the polyamine-curing agent B), or in both components. . . . The polyurethane resin C) can be mixed with component A) or B) by mixing the respective existing aqueous dispersions, or the polyurethane resin C) is, for example, initially mixed with epoxy resin A) and the mixture is then jointly converted into the aqueous phase. Of course all three components A), B) and C) can also be stored separately until they are applied. The polyurethane resin C), diluted with water and optionally organic solvents, can . . . be used . . . to adjust the required application viscosity of the finished coating composition.

Wissing teaches that “[t]he coating compositions also contain water and can additionally contain small quantities of organic solvents” [0076]. Most importantly, however, Wissing acknowledges that its finally prepared aqueous coating compositions are not stable [0080-0083]. Step III of Wissing’s inventive process requires “mixing the epoxy resin A) and the polyamine curing agent B) prior to application of the coating composition” [0083].

Applicant’s Specification teaches that the claimed laminating adhesive is storage-stable when the adhesive retains its adhesive characteristics for a period of 72 hours or more (Spec., p. 18, ll. 1-7). Currently amended Claim 26 requires storage-stability for 2 weeks (Spec., p. 17, ll. 10-20). Wissing does not anticipate or reasonably suggest any coating compositions including a polyurethane resin, an epoxy resin, and a polyamine which are stable after mixing. Wissing states [0071; emphasis added], “A) and B) which are reactive with one another must be stored separately and can only be mixed with one another just before application.” Wissing does not describe or reasonably suggest a storage-stable aqueous dispersion Applicant claims. Thus, whether or not Wissing is effectively antedated by the attached certified English translation of DE 10353953.0, filed in Germany on

Application No. 10/579,715
Reply to Office Action of August 12, 2009

November 18, 2003, the Examiner's rejections under 35 U.S.C. 102/103 over Wissing should be withdrawn.

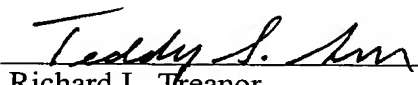
For the reasons stated, Applicant's current claims are patentable over the applied prior art and in condition for allowance. Early notice of allowance is respectfully requested.

Respectfully submitted,

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